# U.S. Fish & Wildlife Service
# National Wild Fish Health Survey Database
# NWFHS Database Documentation

Version 1.1

**Table of Contents:**

# 1. About This Document

This is the help documentation for the National Wild Fish Health Survey Database. This documentation applies to the main user interface. Documentation for the *Basic Search Form* interface is currently being drafted.

The United States Fish & Wildlife Service (USFWS) National Wild Fish Health Survey Database has been available to the public since September 2001. The database contains data on pathogen occurrence in free- ranging (wild) fish populations. This data is collected via the National Wild Fish Health Survey, initiated in 1996 as a collaborative effort among natural resource agencies. The survey is maintained and managed by nine USFWS National Fish Health Centers. Additional information about the National Wild Fish Health Survey (NWFHS) is available at the Survey website .

This documentation is available for download in several formats:

| Format | Size |
|---|---|
| HTML Web- page (on- line viewing) | 595K |
| HTML Web- page (print)* | 675K |
| PDF (requires viewer) | 2MB |

*The PDF format is the recommended method for printing to ensure proper page layout.

# 2. Using Online Help

## 2.1. Navigating Help

The Help Window contains several sections. These sections are accessed using *tabs*. Clicking a tab switches between content sections. The title of the active tab is displayed in **bold**.
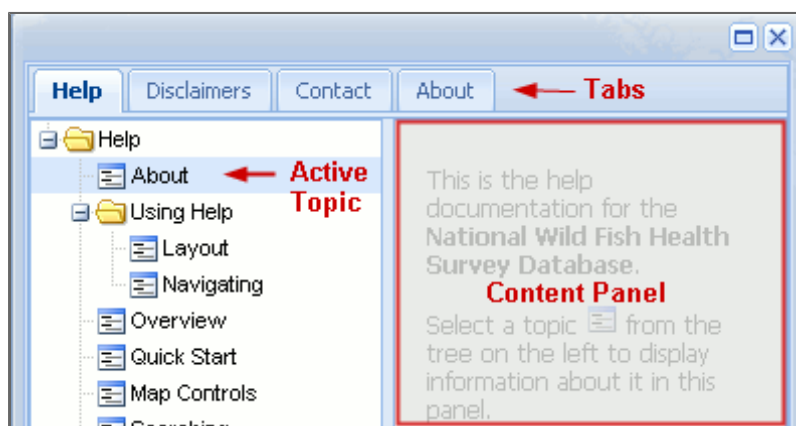


The left panel of the Help Tab displays Help Topics organized by category. Click a folder 🗀 to display topics in that category. Click a topic 🗏 to display information about it in the content panel. There may be a slight delay as the content is retrieved.

## 2.2. Help Controls

You may move the Window by dragging the *title bar*.
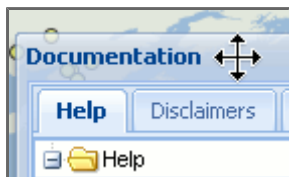


You may resize the Window by dragging the edges.



Alternatively you may resize the Window by using the maximize/ minimize button. The button is located in the upper right corner of the window. Double- clicking the title bar will also maximize/ minimize the window.

You may collapse the Window by clicking the collapse button. This button is located in the upper right corner of the window. When clicked, the window will collapse into the title bar. The Window is still draggable while collapsed.
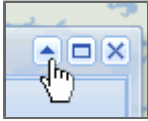


The Help Section is split into two *panels*. The panels may be resized by dragging the *split bar*.
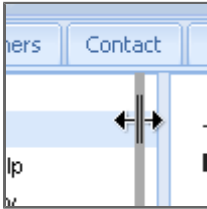
# 3. Overview

## 3.1. Concepts

The NWFHS Database is a web application designed to provide access to data that describes pathogen occurrence in free- ranging (wild) fish populations. This data is collected via the National Wild Fish Health Survey, initiated in 1996 as a collaborative effort among natural resource agencies. The survey is conducted and managed by USFWS National Fish Health Centers.

The Database provides both tabular reports and the ability to create custom maps. These reports are accessed by combining traditional search forms with *spatial*, or map- based, queries. The goal is to provide quick and easy access to individual case and summary reports, as well as maps.

## 3.2. Layout

The NWFHS Database user interface consists of the sections illustrated and briefly described below. See the relevant help topics for additional information about each section.
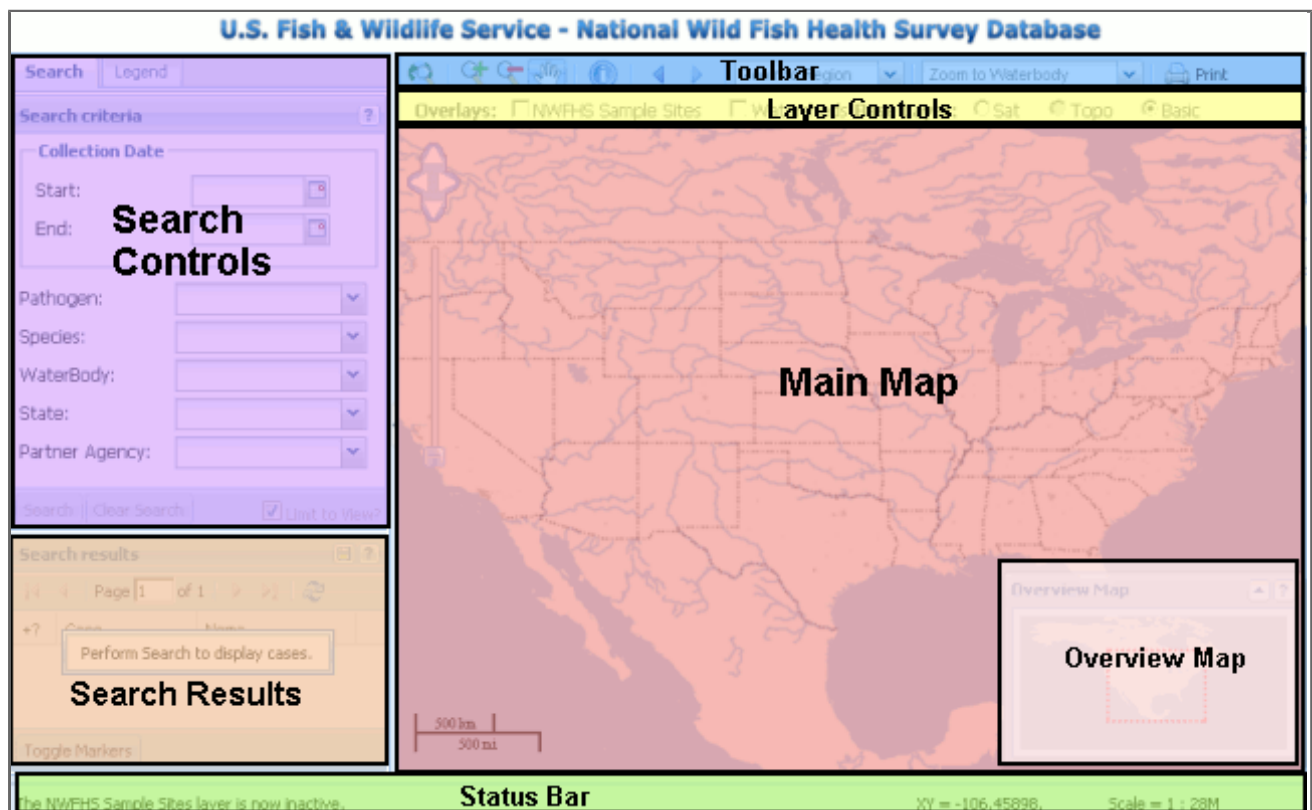


**Main Map:** The Map is displayed here.
**Toolbar:** Buttons for Map Controls and Printing. Also, contains Map Shortcuts.
**Layer Controls:** Controls for choosing Overlay and Base Layers.
**Overview Map:** Reference map. Also, allows quick panning over large distances.
**Search Controls:** Enter Search parameters and options here.
**Search Results:** The search results are displayed here in a table.
**Status Bar:** The status bar shows information about the current state of the application.

## 3.3. Components

Although the Database is a web application, many components of the interface are similar to desktop software applications. Some of these are briefly described below (Note that the functions described below may not be applicable to every instance of a particular component). See the relevant help topics for more specific information.
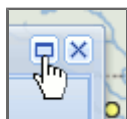
**Windows:**

You may move the Window by dragging the *title bar*.
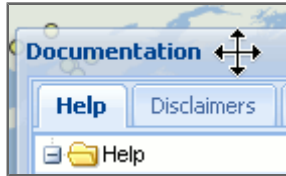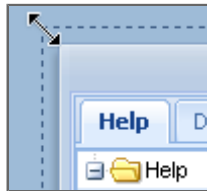
You may resize the Window by dragging the edges.

Alternatively you may resize the Window by using the maximize/ minimize button. The button is located in the upper right corner of the Window. Double- clicking the title bar will also maximize/ minimize the window.

You may collapse the Window by clicking the collapse button. This button is located in the upper right corner of the window. When clicked, the Window will collapse into the title bar. The Window is still draggable while collapsed.

**Panels:**

The user interface is composed of sections called *panels*. For example, the map is displayed in its own panel.

Some panels have special features that allow them to be resized or collapsed. For example, the *Search* panel may be resized or collapsed. These effects are achieved using the *split bar*. The split bar separates panels that allow these types of actions. When the mouse pointer is over the split bar, the cursor icon will change to ◄‖► indicating that the panel may be resized by clicking and dragging the split bar left or right. Panels that display the *collapse button* may be hidden. Clicking this button will collapse the panel into a small bar. Clicking the button when a panel is collapsed will expand the panel to its previous size.
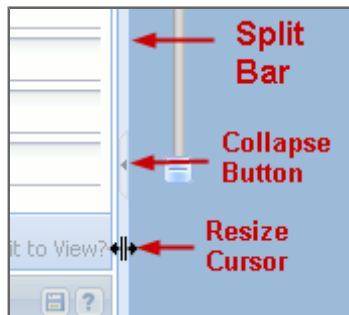
| Search Panel Split Bar | Re- sizing the Search Panel | Search Panel Collapsed |
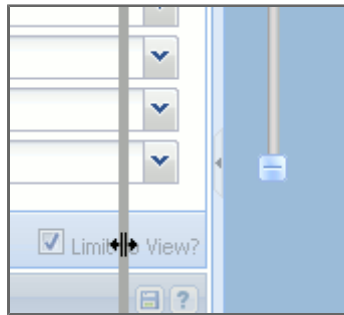
**Buttons & Toolbars:**

Buttons are used to perform specific functions, such as displaying the documentation, enabling the zoom control, or initiating a search. Buttons usually appear in toolbars. Toolbars may contain comboboxes, or drop- down lists, and text fields. Some buttons are grouped together in a toolbar. These buttons are called a *toggle group* . Only one of the buttons in a toggle group may be selected at a time.



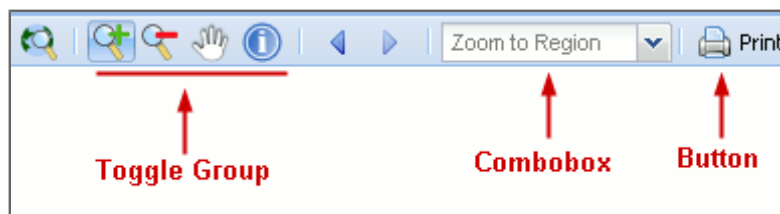**ComboBoxes or Drop- down lists:**

*ComboBoxes*, or drop- down lists, behave similarly to traditional lists with a few added features. To make a selection, click an option in the list.

Clicking the button ( ) on the right side of the combobox will cause the list to "drop- down." Hovering over the list will display a hover *tip*. Very long lists load one page at a time and will have a *paging toolbar* located at the bottom. Comboboxes may be resized by dragging the lower right corner ( ) of the list.
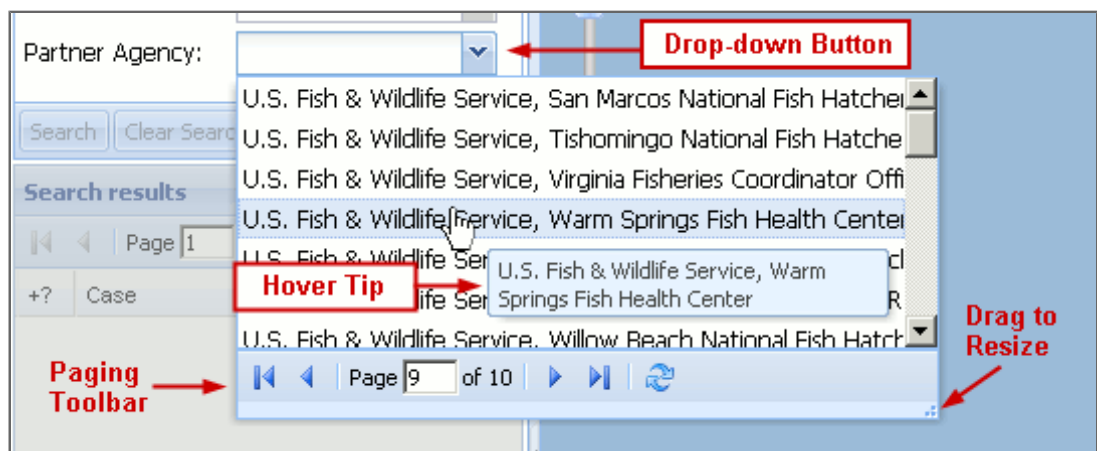


Typing into a combobox will trigger the type- ahead function. The list is dynamically filtered to display only entries containing the typed characters and the first option is automatically selected. A minimum of two characters must be typed to trigger the type- ahead for long lists. Shorter lists (no paging toolbar) will only display options that match exactly what is typed. Long lists will display all options that *contain* the typed sequence; the list will be sorted with exact matches first.
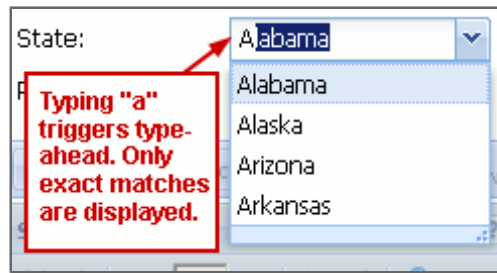
Short list
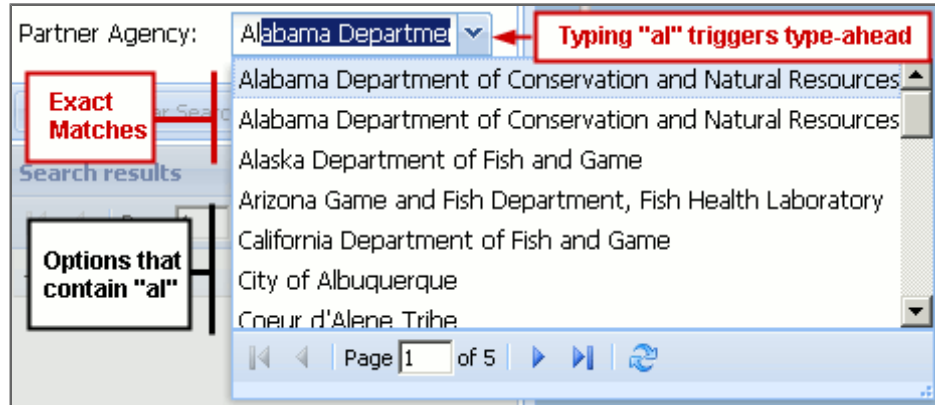


Long list

**Tabs:**

Tabs are used to switch content *within* a panel. The active tab is highlighted and has a **bold** title.
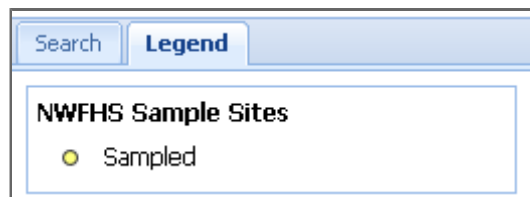
# 4. Quick Start

This section is Under Construction.

# 5. Map Controls

## 5.1. Overview Map

The overview map shows the location of the current view in the context of a larger geographical area. By default, the overview map initially appears in the lower- right corner of the main map panel. The overview map may be repositioned by dragging the title bar or collapsed by clicking the "collapse" button.

Depending on the current zoom level of the main map, the area displayed in the main map is shown as a red box or crosshair in the overview map. The extent of the overview map will change along with the zoom level of the main map.
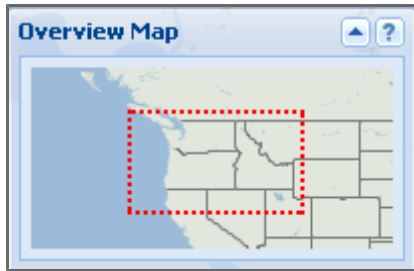


Overview Map showing box
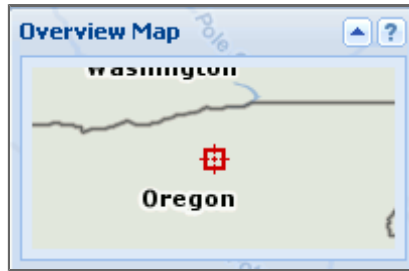


Overview Map showing crosshair

The overview map allows the map to easily be panned large distances. This can be accomplished by either clicking on the desired location on the overview map, or by dragging the box/ crosshair to the desired location.
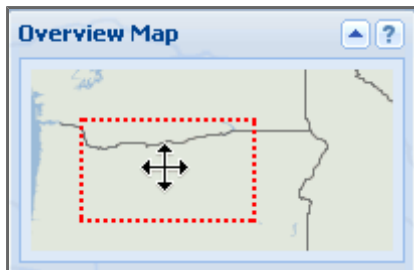


Panning by dragging the overview box

## 5.2. Legend

The legend explains the map symbology. The legend is located in the left- hand panel along with the search form. Click the *Legend* tab to display the map legend.

The legend is updated automatically to reflect the visible map layers. Currently, the legend only displays symbology for the *vector* layers.
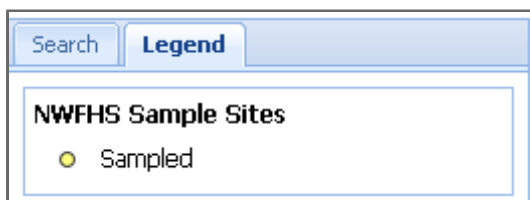


Legend tab activated

## 5.3. Navigation

You may navigate, or change the map view, in several ways. Panning the map moves the map view in two dimensions. Zooming in or out changes the map scale.

**Using the Mouse:**

By default, the mouse may be used for both panning and zooming.

Left click and drag the map to pan. The mouse pointer will change to the move cursor ✛ when panning.

To center and zoom in on a location, do one of the following:

Double click the location.

If your mouse has a scroll wheel, use it to zoom while placing the mouse cursor over the location. This option supports zooming in or out.

**Using the Navigation Controls:**

The navigation controls allow the same type of actions as mouse navigation. The controls are located at the top- left corner of the main map panel.
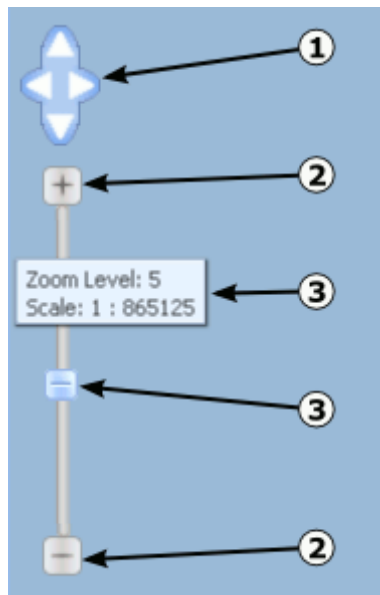


Click the appropriate arrow to pan north, south, east or west.

Click **+** to zoom in on the center of the map. Click **-** to zoom out. Each click will zoom one level.

Drag the slider to zoom in or out. Hovering over the slider will display the current zoom level and map scale.

**Toolbar Navigation Controls:**



The main toolbar contains several navigation tools. These tools are described below:

**Zoom to Full Extent:** This tool will zoom out to the maximum map extent of the main map.

Some toolbar navigation controls determine the effect the mouse has on the map. These controls are activated using the buttons in the toolbar. These controls are toggled on or off.

**Zoom In:** Click the Zoom In tool and then click a location on the map to zoom in to that location. Each click will zoom in one level. You can also

zoom in to a selected area by clicking and dragging the cursor to create a selection box over the area of interest.

**Zoom Out:** Click the Zoom Out tool and then click a location on the map to zoom out from that location. Each click will zoom out one level. You can also zoom out to a selected area by clicking and dragging the cursor to create a selection box over the area of interest. The size of the selection box is inversely proportional to the distance zoomed out, the smaller the box the greater the distance.

**Pan:** This is the default navigation control. When enabled, left click and drag the map to pan. The mouse pointer will change to the move cursor ✛ when panning. Double click a location to zoom in.

◀ ▶ **Navigation History:** Use the navigation history control to return to previously viewed map extents. Click the left arrow to move backwards through the navigation history, click the right arrow to move forward. The navigation history applies to the main map extent only; layer status and search history are not restored.

## 5.4. Shortcuts

The navigation shortcuts allow you to quickly zoom to a predefined location on the main map. The shortcuts are located on the main toolbar in the form of combo- boxes (drop- down lists).
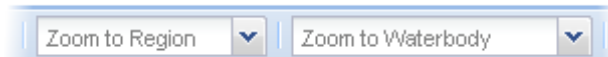


**Zoom to Region:** Select an option from the list to zoom to a region of the United States. The map will zoom to the highest level where the entire region is visible. The actual zoom level is determined by the size(dimensions) of the main map panel.

**Zoom to Waterbody:** Select an option from the list to zoom to a waterbody. This list supports type-ahead; type at least two letters to activate the search. Only waterbodies that have been sampled are included in the list. The map is centered on the primary coordinates of the feature as defined by the U.S. Board on Geographic Names. For areal features, such as ponds and lakes, coordinates are at the approximate center, and for reservoirs at the dam. The primary coordinates for linear features, such as streams, is at the mouth.

**Hint:** Type a comma followed by the state postal abbreviation to retrieve a list of waterbodies for an individual state.
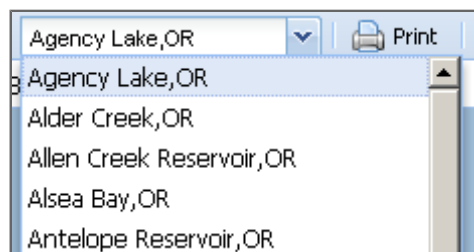


Typing ",OR" returns all waterbodies for Oregon.

# 6. Map Layers

## 6.1. What is a Layer?

Layers are one component of a Geographic Information System(GIS). A GIS is a computer system that captures, stores, analyzes, manages, and displays information about geographic places. This information is often referred to as *spatial* or*geospatial* data. The National Wild Fish Health Survey Database is a GIS.

In a GIS, a *feature* is an object with a geographic location. Features usually represent real- world objects on a map. A layer, sometimes called a theme, is a collection of geographic features. *Vector* layers may be composed of points (e.g. sample sites), lines (e.g. streams) or polygons (e.g. lakes). *Raster* layers appear as images, such as satellite photos or USGS topographic maps. Layers organize collections of features within a GIS. For example, one layer might contain roads, while another contains streams and lakes.

A GIS provides tools for managing the visibility, ordering, and opacity(or transparency) of layers. Layers may be viewed separately, or stacked and viewed together. This allows the user to determine the spatial relationships between the layers, as well as between features contained within different layers. The image below illustrates the concept of layers as a set of "overhead transparencies."
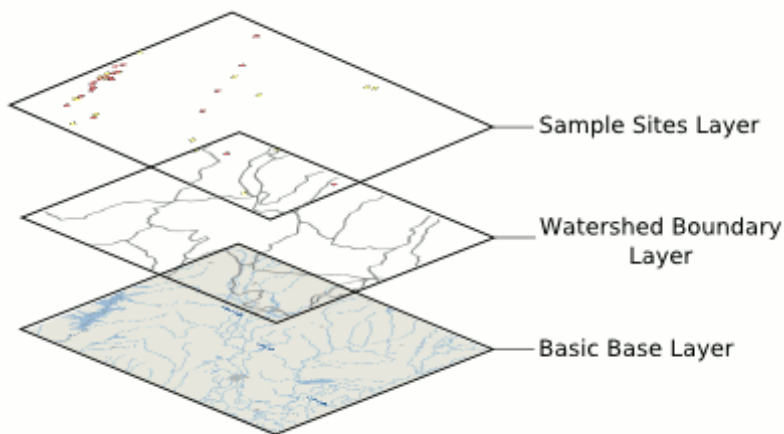


GIS layers have independant opacity.

The image below, demonstrates this effect. The backgrounds of the Sample Sites and Watershed Boundary layers are rendered transparent. This allows the Basic Base layer to be visible.
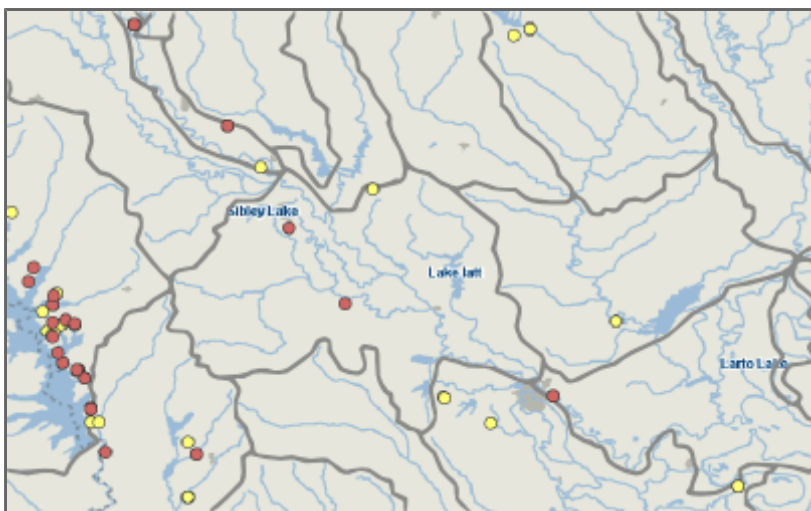


The result of combining the layers.

## 6.2. Layer Controls

The active layers may be managed using the Layer Controls. The main Layer Controls are located in the bar below the main toolbar and directly above the main map. Click the name of the layer or the associated radio button/ checkbox to activate the desired layer.
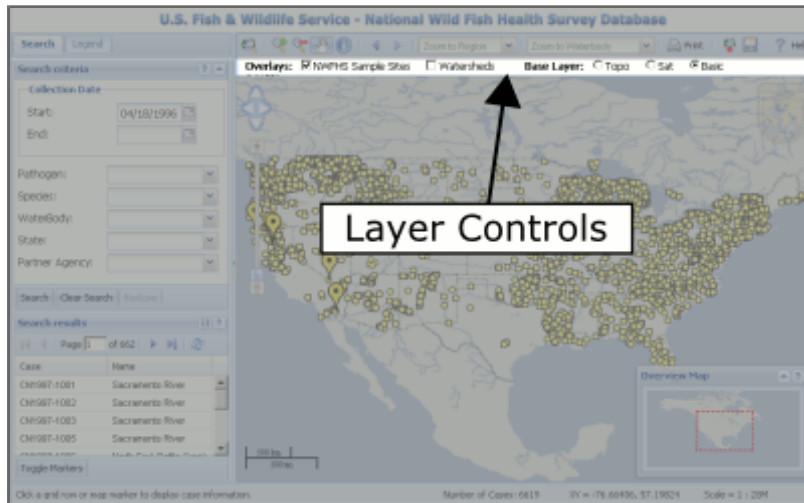


The layer control bar

## 6.3. Base Layers

The Base Layers are used for locational reference and provide the background for the main map. A base layer should always be visible. The base layers provide less detail at smaller scales(zoomed out) and greater detail as you zoom in(larger scales).

The active base layer may be selected using the Base Layer option in the Layer Control. Click the name of the layer or the associated radio button to activate a base layer.
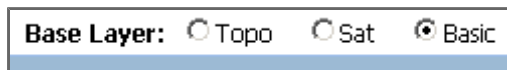


The Base Layer control

The following base layers are available:

**Basic:** This is the default base layer. The Basic layer displays U.S. state boundaries, hydrologic features, and urban areas. Labels for these features appear at higher zoom levels.

The Basic layer is maintained and supported by the USFWS in conjunction with the NWFHS database.

Basic Layer Metadata

**Sat:** The Satellite layer presents low- resolution imagery for the world and high- resolution imagery for the United States and other metropolitan areas around the world.

The Satellite layer is maintained and supported by ESRI. The USFWS is not responsible for the content or availability of this map service.

Satellite Layer Metadata

**Topo:** The Topo layer presents land cover imagery for the world and detailed topographic maps for the United States. The service includes NPS Natural Earth physical map at small scales. You must zoom in to view the actual topographic maps.

The Topo layer is maintained and supported by ESRI. The USFWS is not responsible for the content or availability of this map service.

Topo Layer Metadata 🔲

## 6.4. Overlays

The Overlay Layers present geographic features derived from NWFHS data. The features in the overlays may be filtered using the Search Control.

The overlay layers may be viewed alone or in combination by selecting the appropriate checkbox(es) in the Layer Control bar. The opacity of certain overlays may also be changed using the opacity slider control. The opacity control will appear beneath the layer name, when available.
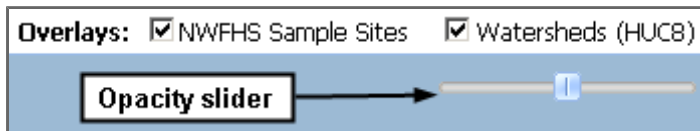


The Overlay Layer controls.

The following Overlays are available:

**NWFHS Sample Sites:** This layer is visible by default. The NWFHS Sample Sites layer displays point features representing individual sampling events, or cases, from the Survey. NWFHS Cases may involve one or more species, each of which may be tested for multiple pathogens. At the time of data entry, the Fish Health Centers provide a latitude and longitude for each collection. Every attempt is made to ensure the accuracy of these coordinates, however it cannot be guaranteed.

The NWFHS Sample Sites layer may be filtered by performing a search. The color of the point indicates the status of individual cases. The Legend provides an explanation of what each color represents.

The NWFHS Sample Sites layer is maintained and supported by the USFWS in conjunction with the NWFHS database.

NWFHS Sample Sites Metadata 🔲

**Watersheds(HUC8):** This layer is not visible by default. The Watersheds layer displays hydrologic unit boundaries for the United States, Puerto Rico, and the U.S. Virgin Islands. It was derived from the Hydrologic Unit Boundaries map layer included in the National Atlas of the United States of America. Each of the boundaries in the layer is assigned a unique 8- digit hydrologic unit code or HUC.

The Watersheds layer may be filtered by performing a search. The color of the watershed indicates its status with respect to the NWFHS. The Legend provides an explanation of what each color represents.

The Watersheds layer is maintained and supported by the USFWS in conjunction with the NWFHS database.

Watersheds Layer Metadata 🔲

# 7. Searching

## 7.1. Search Overview

There are multiple ways to search the NWFHS Database. The database may be searched by using the search form, the map controls, or by using a combination of these methods. The search form provides the ability to query the database for features that match specific parameters. The *identify* tool allows you to quickly identify features at a given location on the main map. *Spatial* queries may be performed by using the search form in conjunction with the map controls. See the appropriate help topic for in depth information on each of these search methods.

When a search is performed using the Search Form, available data is filtered using the supplied criteria and only data matching all of the criteria is returned. By default, a search is performed when the database is initialized. The single parameter for the initial search is the earliest date of sample collection. When no search is active, all features are displayed.

Once a search has been successfully completed, search results will appear in the grid panel below the search form. The search results are derived using both the search criteria and the main map extent. Each row in the search results grid is represented by a corresponding *marker* on the main map. See the appropriate help topic for in- depth information on search results.



Location of the Search Panel.

## 7.2. Search Form

The search form provides the ability to query the database for features that match specific parameters. It is located in the top half of the left panel. The **Search** tab must be active to view the search form. The search form may be collapsed by clicking the collapse tool ( ⏷ ) in the title bar, click again to restore the search form.

Search Form Controls

Search parameters may be specified using any combination of the fields in the form. Entering multiple search criteria will narrow the scope of the search. The search query is built cumulatively from the criteria entered. For example, if all fields are filled out, the search query would be defined as:

```
Return all features where Species was
collected between Start Date and End Date
from Waterbody located in State
submitted by Partner Agency
and tested for Pathogen
```

## Search Fields

The following search fields are available:

**Collection Date:** This *fieldset* allows the data to be restricted to a date range. Either or both of the date fields may be used. Invalid dates are converted to a valid date (for example, February 31 becomes March 3 in a non- leap year).

> **Start Date:** All data collected before this date will be ignored. The default is the earliest date in the database. This field will not accept a value preceding the default date.

> **End Date:** All data collected after this date will be ignored. This field will not accept a date value after the current date.

The *date picker* is enabled for these fields. Dates must be in the format m/ d/ Y.

**Pathogen:** When a pathogen is selected, the query returns data from sites where samples were tested for the selected pathogen.

Selecting *Any Pathogen* will only return data for sites where a pathogen was **detected**. Only pathogens that are actually present in the database will appear in the list. Submitting a value for this field affects the pathogen status symbology(color) of the map overlay layers.

Type- ahead is enabled for this field. Values must appear in the drop- down list to be valid.

**Species:** This field enables the selection of a family,genus, or species. When selected, the query returns data from sites where samples of this species were collected.

The list for this field contains the common name of every family, genus, and species present in the database. Hover over the common name to display the scientific name. To ease selection, the list is color- coded according to the following scheme:

Family is red
Genus is blue
Species is black
Exact matches are **bold**(type to activate)

Type- ahead is enabled for this field. Values must appear in the drop- down list to be valid.

**Waterbody:** This field enables the selection of a waterbody or geographic feature by name. When selected, the query returns data from all sample sites associated with the named feature. This may return data from multiple features if features share a common name. Only features that are actually present in the database will appear in the list.

Type- ahead is enabled for this field. Values must appear in the drop- down list to be valid.

**State:** This field enables the selection of a State. When selected, the query returns data from all sample sites contained within the boundaries of the selected state. Only states that contain sample sites will appear in the list.

Sample sites are associated with states based on geographic location. Some sites are not located within any state boundaries.

Type- ahead is enabled for this field. Values must appear in the drop- down list to be valid.

**Partner Agency:** Limits the query to sample sites associated with the selected agency. Only agencies that are actually present in the database will appear in the list.

The partner agency is determined by the responsible USFWS Fish Health Center at the time of collection/ submission. The agency usually reflects the main partner in physical collection of samples, jurisdiction, or management responsibilities. In certain instances, the agency may be listed as the USFWS Fish Health Center.

Type- ahead is enabled for this field. Values must appear in the drop- down list to be valid.

## Search Button Controls

The search form is managed using the search button controls. These controls are located at the bottom of the search panel. The status of each button depends on the state of the search form and whether there is an active search. The buttons appear grayed out when disabled.
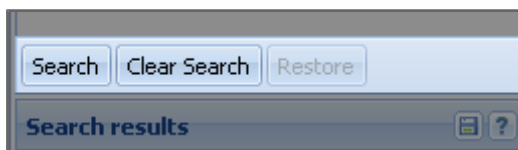


Search Button Controls. The restore button is disabled.

**Search:** Clicking the *Search* button initiates a query using the input supplied in the search form fields. The Search button is enabled when at least one field contains a valid value.

**Clear Search:** Clicking the *Clear Search* button clears any input in the search form and removes the current search filter.The Clear Search button is enabled when there is an active search.

**Restore:** The*Restore* button restores the search form input to a state that reflects the current search. The Restore button is enabled when the input in search form fields is modified and does not reflect the active search.

## 7.3. Search Results

Results from a successful query will appear in the *Search results* panel.
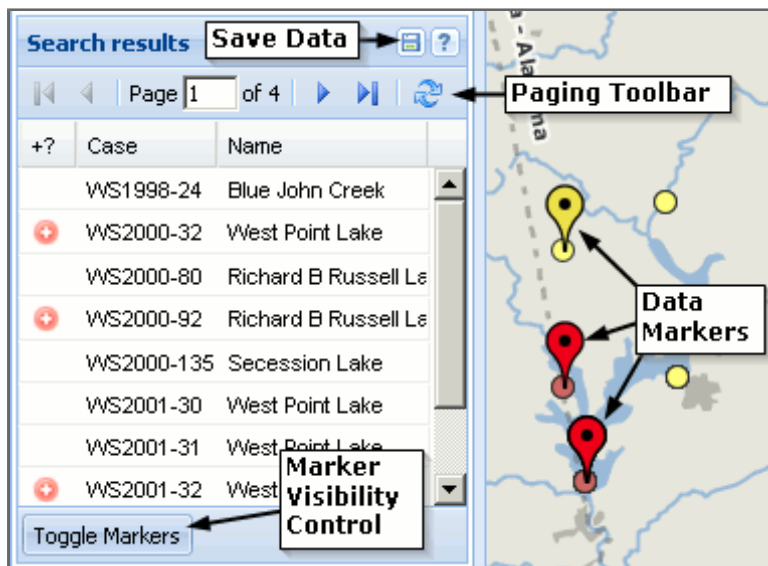
The Search Results panel.

NWFHS cases matching the search criteria are displayed in the results table. The search results table is paginated, displaying up to ten records at once. The first, previous, next, and last page of search results may be accessed using the paging toolbar buttons. Specific pages may be accessed directly by typing the desired page number into the paging toolbar and pressing the enter or return key. Clicking the Save Data button ( ) in the title bar will open the *Download Options* dialog window.

The results table is comprised of the following columns:

> **+?**:By default, this column is only visible when a pathogen has been included as part of the search criteria. A plus ( ) in this column indicates that the pathogen was detected in the corresponding NWFHS case.
> **Case**:The NWFHS case number. The case number uniquely identifies each case. Two- letter lab code, followed by the fiscal year in which the samples were received, followed by a dash, and a numeric identifier.
> **Name**:The name of the geographic feature associated with the NWFHS case. Usually a waterbody.

Each row in the search results table corresponds to a *data marker* on the main map. The color of each marker is determined by the status of the NWFHS case as indicated in the legend. Either data markers or rows in the results table may be selected by clicking them. The selected data row is highlighted; the corresponding marker is enlarged.

Upon selection, a *popup* will be displayed on the main map. The popup contains a table with information about the selected NWFHS case. The popup header displays the selected case number. The footer displays the case XY location, which, when clicked, zooms/ pans to the case location on the main map. Clicking the links in the popup will open the report window for that particular entity(see the *Reports* help section for a description of the reports).
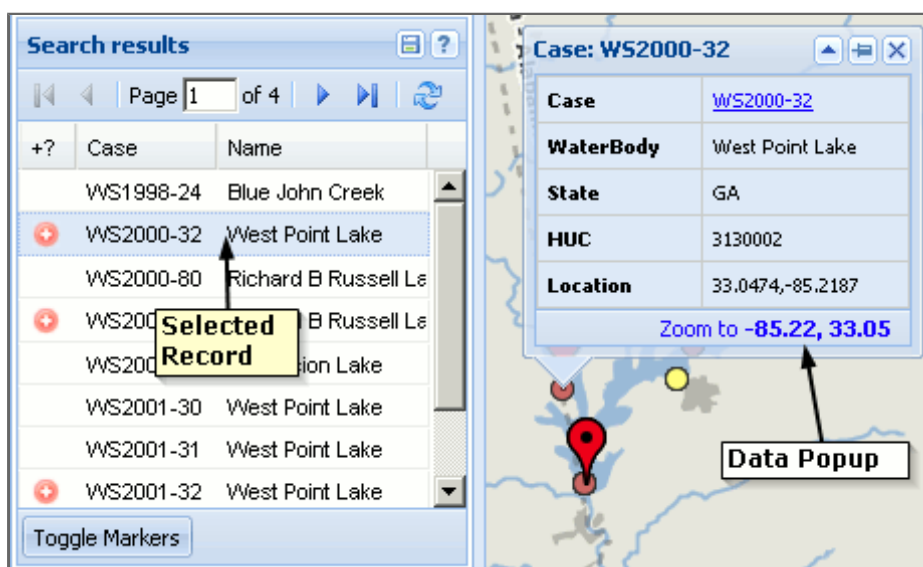
Select a row or marker to show the data popup.

The popup window may be either *pinned*, attached to the case location, or *unpinned*, the window is unattached and draggable. The mode may be toggled by clicking the pin button (  ) in the popup's title bar. The popup will remain unpinned until it is closed.
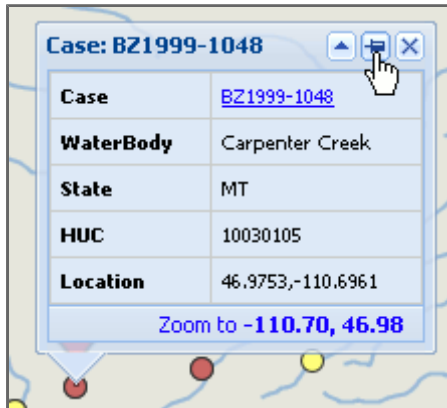


Popup "pinned" to the current case location.
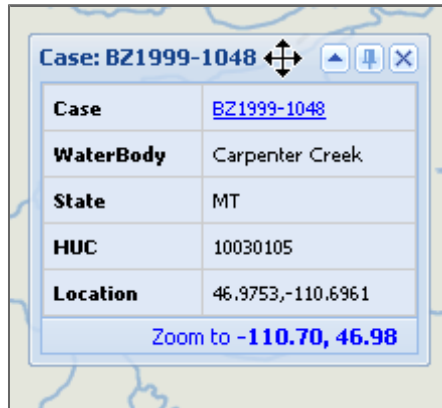


"Unpinned" popup maybe repositioned within the browser window.

## 7.4. Spatial Searches

In addition to querying via the Search Form, the database may be searched *spatially* by manipulating the main map extent. Cases must meet the current search criteria *and* be visible on the main map to appear in the search results table. Changing the extent, or bounds, of the main map will filter the case records in the search results. Any of the zooming or panning tools may be used to achieve this effect. This ability is useful in identifying multiple case records that fall within a specific area. This effect is demonstrated by the following images.
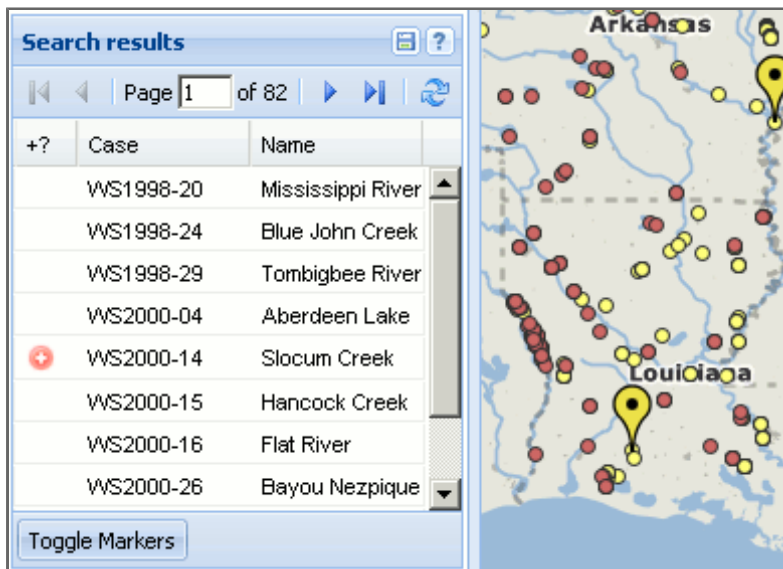


Eighty- two pages of records are displayed when zoomed out.
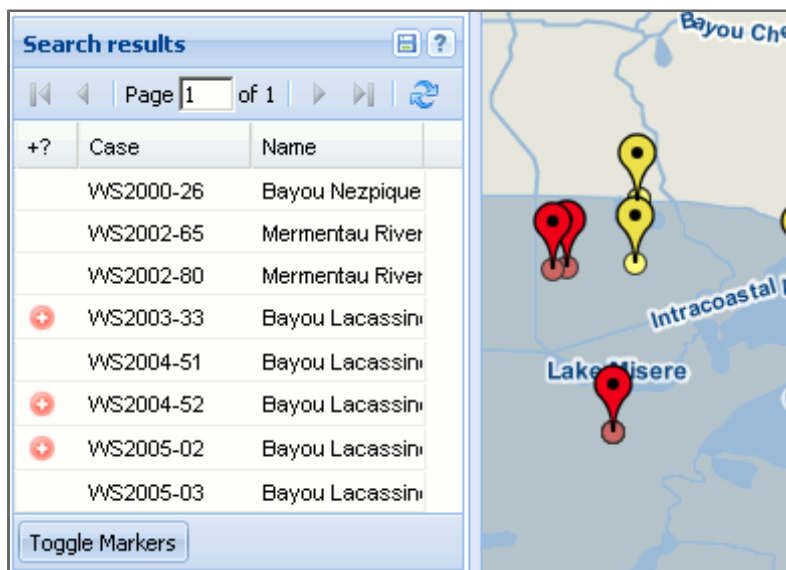
The cases are filtered by zooming in on the desired area.

## 7.5. Identifying Features

Features on the map may be identified using the identify tool. The identify tool is located on the main toolbar.



Identify button on the toolbar.

When the identify tool is activated, single- clicking a location on the main map will initiate a query for NWFHS sample site features at that location. A successful query will open a *popup* on the main map containing a table with information about the queried location. The footer displays the XY location of the identify query, which, when clicked, centers the main map at the specified location. Clicking the links in the popup will open the report window for that particular entity(see the *Reports* help section for a description of the reports).
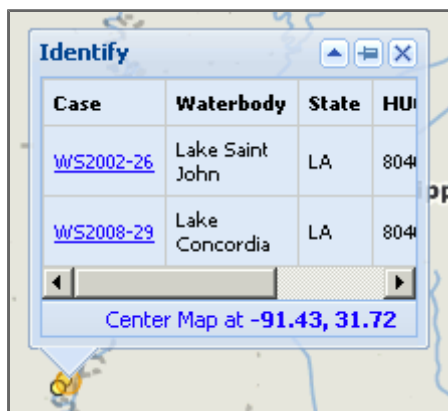


The identify popup "pinned" to the click location.

The identify query performs a search for all features falling within a radius of six pixels from the XY location of the mouse click. The five closest features are returned in ascending order of distance from the click point. The search area is shown as an orange circle on the main map. The actual distance of the search radius will vary depending on the zoom level of the map. The six pixel radius will cover a smaller distance when the map is zoomed in, and a larger distance when the map is zoomed out.

The popup window may be either *pinned*, attached to the identified location, or *unpinned*, the window is unattached and draggable. The mode may be toggled by clicking the pin button (  ) in the popup's title bar. The popup will remain unpinned until it is closed.



"Unpinned" popup maybe repositioned within the browser window.
The popup has also been resized.

# 8. Reports

## 8.1. Reports Overview

One of the main goals of the NWFHS Database web interface is to provide access to reports derived from Survey data. Currently, only the *Case Report* is implemented. However, additional reports are under development (watershed, state, waterbody, and agency). Reports are available in both HTML(web page) and PDF formats.

Reports may be accessed from within the database interface by performing a search or by using the identify tool. When using either method, reports are accessed by clicking the appropriate link in the data *popup*. Clicking the link opens the report window.

For details about searching, identifying, and popups, see the relevant topics in the *Searching* help section.
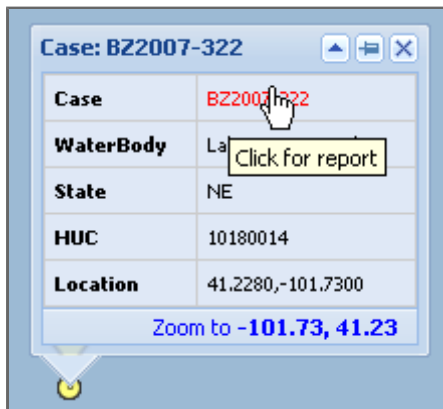


Data popup showing link to the Case Report

The report window may be moved, maximized, or resized. The report may contain links to other web pages or reports. Clicking these links will load the web page or report into the report window. The report controls, described below, are located at the bottom of the report window.



The report window

**Report Controls:**

**Download PDF:** Clicking the *Download PDF* button initiates a download of the current report in Portable Document Format (PDF). The PDF may be printed or saved. The PDF report may be opened using a PDF viewer, such as Adobe Reader.

**Permalink:** The*Permalink* button will display a "permanent link" to the current report. Clicking the link will open the report in a new browser window or tab. This link, or URL, allows the report to be accessed directly. The most recent version of the report is retrieved each time the link is accessed . Permalinks are useful for distributing reports, since they may be bookmarked and embedded in other documents or e- mail.
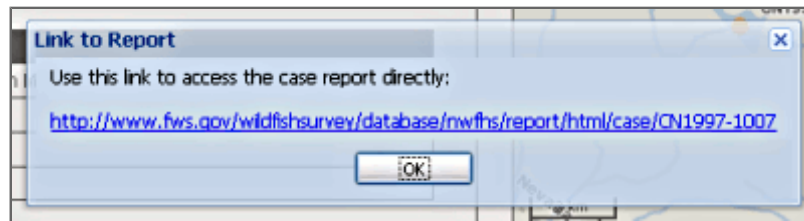


The report Permalink window

**Reload Report:** The*Reload Report* button reloads the initial report. Use this function to restore the report when other web pages or reports have been loaded into the report window.

**Close:** The*Close* button closes the report window.

Reports may also be accessed by using the report *web service*. The report web service allows reports to be accessed via a URL, without using the database interface. The report permalink is an example of a web service. See the *Web Services* help section for details.

## 8.2. Case Report

**Description:**

The*Case* Report is available for each NWFHS case. A case is defined as a group of samples collected in a single effort at a single location. Multiple species may be included in a single case.

**Available Formats:**

HTML: Web Page. Viewable in web browser.

PDF: Portable Document Format. Viewable using software capable of reading PDF files, such as Adobe Reader.

**Layout:**

The Case Report layout.

**Attribute Descriptions:**

**Case Information:** General background information for the case.

Lab: USFWS Fish Health Center responsible for managing the case.

Partner Agency: Primary organization collaborating on case, usually assisting with sample collection

Case Number: Unique identifier assigned to each case by managing USFWS Fish Health Center

Tracking Number: Optional case identifier

Type of Sampling: Indicates whether sample collection was routine or motivated by a particular purpose, such as investigating a fish kill, that might have suggested unusual circumstances (diagnostic).

Date Collected: Date of sample collection

Date Received: Date samples were received by the USFWS Fish Health Center

Date Completed: Date case was completed

**Site Description:** Description and characteristics of the sample site.

Waterbody Name: Name of the geographic feature sampled as designated by the U.S. Board on Geographic Names

Site Name: Sample site identifier(name) assigned at the time of sample collection

Site Description: Supplemental description of the sample site

Water Temp.: Sample site water temperature in degrees Celsius at the time of collection

**Spatial Information:** Attributes associated with the geographic location of the sample site.

GNIS Id: Permanent and unique feature record identifier that is assigned to the sampled geographic feature by the U.S. Board on Geographic Names

Latitude: The latitude of the sample site

Longitude: The longitude of the sample site

Datum: The geodetic reference system used to determine the latitude and longitude of the sample site

Elevation: The elevation of the sample site in meters

State Name: Name of the state where sample site is located

County: Name of the county in which sample the site is located

HUC 8- digit: 8- digit hydrologic unit code (HUC) of the watershed that contains the sample site location.

HUC Name: Name associated with the 8- digit hydrologic unit code (HUC)

**Sample Information:** List of all samples(species) associated with the case.

Common Name: The common name of the sampled species

Code: The three- letter code representing the sampled species. The code is assigned and maintained by the USFWS National Fish Health Database Coordinator.

Species: The full scientific name of the sampled species

ITIS TSN: Taxonomic Serial Number, the unique identifier assigned to the sampled species in the Integrated Taxonomic Information System (ITIS)

Number Collected: The number of individual animals collected of the species

Collection Method: The collection method used to obtain species samples

**Assay Results:** Results of assays grouped by sample type.

Species Code: The three- letter code representing the sampled species. The code is assigned and maintained by the USFWS National Fish Health Database Coordinator.

Specimen: The tissue, or combination of tissues, collected from the sample

Number Tested: The total number of individual samples (animals) from which the associated specimen was taken for the indicated assay(s)

Preliminary Assay: This is the first method that is applied to specimens being tested. The current list of preliminary methods is available in the NWFHS Laboratory Procedures Manual.

Corroborative Assay: This is the second method that might be used to test a specimen when the preliminary procedure indicates the possible presence of a pathogen. The current list of corroborative methods is available in the NWFHS Laboratory Procedures Manual.

Pathogen Detected: The pathogen that was detected in the specimen by the preliminary assay and confirmed by the corroborative assay.

# 9. Printing

The current map view may be printed by clicking the *Print* button in the main toolbar. A PDF file will be generated showing the map. The printed map extent(displayed area) will include at least the extent shown on the main map at the time of printing. The printed map may be displayed at a lower zoom- level than the main map to ensure the entire extent is viewable.

**NOTE**: Currently *Basic* is the only base layer that is available for printing. The Basic base layer will be used for printing even with a different base layer activated in the main map.



Print button

The printed PDF contains a main map, overview map, scale bar, and north arrow. The date and time of generation is also displayed. A PDF viewer is necessary to open the printed map file.
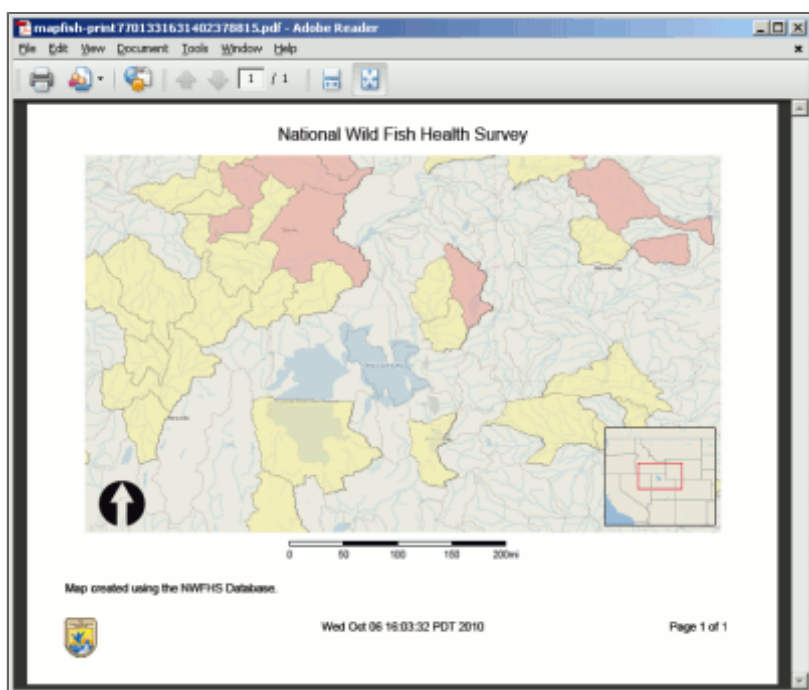


Print PDF

# 10. Saving Map Images

The current main map image may be saved by clicking the *Save map image* button in the main toolbar. An image file will be generated of the main map extent, including the base layer and any active overlays. The image file is in JPEG format.

**NOTE**: Currently *Basic* is the only base layer that is available for saving map images. The Basic base layer will be used for generating the image even with a different base layer activated in the main map.



Save map image button

The image is displayed in the Image Preview window. Right- Click on the image and choose "Save Image As..." to download the image. Alternatively, the image may be opened in a new browser window (or tab) by clicking the link in the title bar. The data and time of image generation appears in the lower left corner of the image.
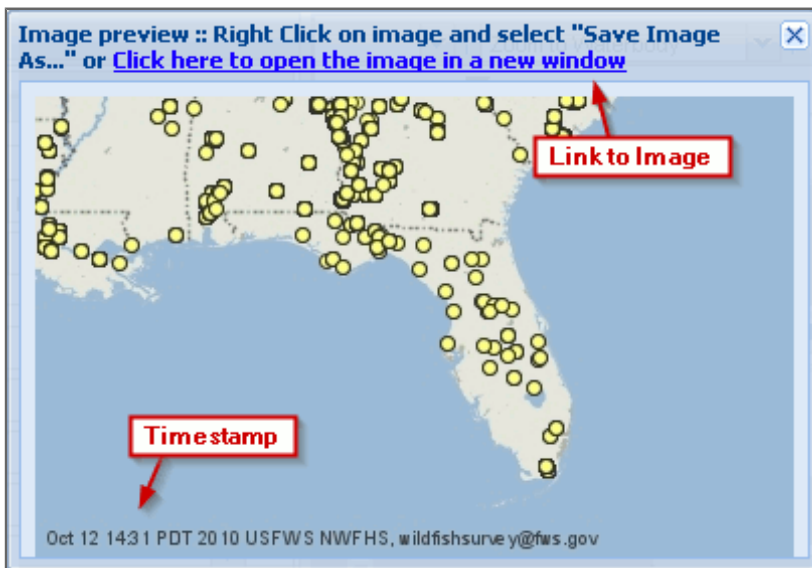


The Image Preview window

# 11. Downloading Data

## 11.1. Download Overview

One of the goals of the NWFHS Database web interface is to provide access to Survey data in a format that is familiar and accessible to users. Data may be downloaded with or without an active search. If a search has been performed, the data will be filtered using the current search parameters.

The data download process may be initiated by clicking the *Save Data* button in the main toolbar. Alternatively, when a successful search has been performed, the *Save Data* button in the *Search results* title bar may be used. Clicking either button will open the *Download Options* window.



*Save Data* button in the main toolbar.



*Save Data* button in the *Search results* title bar.

The *Download Options* window displays available settings for downloading data. Select a combination of options to define the data request.



The Download Options window

**Download Options:**

**Select Format:** Data is available in the following formats (see the associated help topics for details on these data formats):

A **comma- separated values (CSV)** file is a delimited text file that uses commas to separate values. CSV is commonly used to store tabular data. This makes it a good format for use in spreadsheet and database applications.

**Keyhole Markup Language (KML)** is a spatial file format developed for use with Keyhole Earth Viewer, now known as Google Earth. KML is recognized as an open standard for geobrowsers by the Open Geospatial Consortium.

**Select Range:** This option determines what, if any, spatial boundaries are applied in the data request:

**Only include sample sites that are currently visible on the map:** Selecting this option will only return data for sites that fall within the current extent of the map.

**Include all sample sites:** This option will return data from all sites that match the search criteria, if any, regardless of visibility.

Once options have been selected, clicking the *Submit* button will send the data request. Upon successful retrieval of the data, a confirmation window will appear with instructions on retrieving the data file. Large data files (over 1 megabyte) will be returned in a compressed *zip* format to reduce file size. A Zip- compatible compression utility is required to decompress files in zip format.
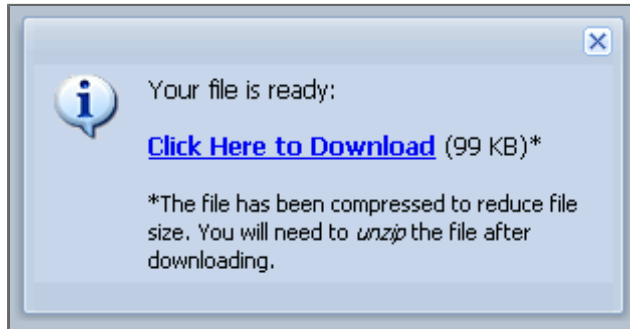


The Download Confirmation window

## 11.2. CSV Format

**Description:**

A**comma- separated values (CSV)** file is a delimited text file that uses commas to separate values. CSV is commonly used to store tabular data. This makes it a good format for use in spreadsheet and database applications.

**Attribute Descriptions:**

**Search Options:** The search criteria used to generate the data file is included. Only the fields included in the search criteria are listed in data file.

Start: All data collected on or after this date is included.

End: All data collected on or before this date is included.

Pathogen: The pathogen searched for.

Species: The family,genus, or species searched for.

Waterbody: Waterbody or geographic feature name associated with sample site.

State: State containing the sample site.

Partner Agency: Agency associated with sample site.

Map Bounds: The map bounding box coordinates used to filter the sample sites.

**Column Descriptions:** The following columns are included in the CSV data file.

id: Unique record identifier (NOT immutable)

lab: USFWS Fish Health Center responsible for managing the case.

casenumber: Unique identifier assigned to each case by managing Fish Health Center

agency: Primary Organization collaborating on case, usually assisting with sample collection

agency2: Primary Organization collaborating on case, usually assisting with sample collection

collectiondate: Date of sample collection

datereceived: Date samples were received by the Fish Health Center

datecompleted: Date case was completed

waterbody: Name of the geographic feature sampled as designated by the U.S. Board on Geographic Names

sitename: Sample site identifier(name) assigned at the time of sample collection

sitedescription: Supplemental description of the sample site

gnisid: Permanent, unique feature record identifier assigned to the sampled geographic feature by the U.S. Board on Geographic Names

latitude: The latitude of the sample site

longitude: The longitude of the sample site

datum: The geodetic reference system used to determine the latitude and longitude of the sample site

watertemp: Sample site water temperature in degrees Celsius at the time of collection

elevation: The elevation of the sample site in meters

statename: Name of the state where sample site is located

county: Name of the county in which sample site is located

huc: 8- digit hydrologic unit code (HUC) of the watershed that contains the sample site location

hucname: Name associated with the 8- digit hydrologic unit code (HUC)

commonname: The common name of the sampled species

species: The full scientific name of the sampled species

speciescode: The three- letter code representing the sampled species. The code is assigned and maintained by the USFWS National Fish Health Database Coordinator.

itistsn: Taxonomic Serial Number, the unique identifier assigned to the sampled species in the Integrated Taxonomic Information System (ITIS)

numbercollected: The number of individual animals collected of the species

collectionmethod: The collection method used to obtain species samples

specimen: The tissue, or combination of tissues, collected from the sample

numbertested: The total number of individual samples (animals) from which the associated specimen was taken for the indicated assay(s)

pathogentested: The pathogen for which the specimen was analyzed

prelimassay: This is the first method that is applied to specimens to be tested. The current list of preliminary methods is available in the NWFHS Laboratory Procedures Manual.

prelimpoolstested: Number of pools analyzed using the preliminary assay

prelimpoolsdetected: Number of pools in which the pathogen was detected using the preliminary assay

corrobassay: This is the second method that might be used to test a specimen when the preliminary procedure indicates the possible presence of a pathogen. The current list of corroborative methods is available in the NWFHS Laboratory Procedures Manual.

corrobpoolstested: Number of pools analyzed using the corroborative assay

corrobpoolsdetected: Number of pools in which the pathogen was detected using the corroborative assay

pathogendetected: The pathogen that was detected in the specimen by the preliminary assay and confirmed by the corroborative assay.

## 11.3. KML Format

**Description:**

**Keyhole Markup Language (KML)** is a spatial file format developed for use with Keyhole Earth Viewer, now known as Google Earth. KML is recognized as an open standard for geobrowsers by the Open Geospatial Consortium.

KML definition from Wikipedia:

> KML is an XML- based language schema for expressing geographic annotation and visualization on Internet- based, two- dimensional maps and three- dimensional Earth browsers.

**Attribute Descriptions:**

**Search Options:** The search criteria used to generate the data file is included. Only the fields included in the search criteria are listed in data file. This data is contained in the description element of the KML document.

Start: All data collected on or after this date is included.

End: All data collected on or before this date is included.

Pathogen: The pathogen searched for.

Species: The family,genus, or species search for.

Waterbody: Waterbody or geographic feature name associated with sample site.

State: State containing the sample site.

Partner Agency: Agency associated with sample site.

Map Bounds: The map bounding box coordinates used to filter the sample sites.

**Column Descriptions:** The following data are included in the description for each placemark in the KML file.

Lab: USFWS Fish Health Center responsible for managing the case.

Case Number: Unique identifier assigned to each case by managing Fish Health Center

Partner Agency: Primary Organization collaborating on case, usually assisting with sample collection

Partner Agency2: Subunit of primary Partner Agency

Collection Date: Date of sample collection

Date Received: Date samples were received by the Fish Health Center

Date Completed: Date case was completed

Waterbody: Name of the geographic feature sampled as designated by the U.S. Board on Geographic Names

Site Name: Sample site identifier(name) assigned at the time of sample collection

Site Description: Supplemental description of the sample site

GNIS ID: Permanent, unique feature record identifier assigned to the sampled geographic feature by the U.S. Board on Geographic Names

Latitude: The latitude of the sample site

Longitude: The longitude of the sample site

Datum: The geodetic reference system used to determine the latitude and longitude of the sample site

Water Temp(C): Sample site water temperature in degrees Celsius at the time of collection

Elevation(m): The elevation of the sample site in meters

State Name: Name of the state where sample site is located

County: Name of the county in which sample site is located

HUC (Watershed): 8- digit hydrologic unit code (HUC) of the watershed that contains the sample site location

HUC name: Name associated with the 8- digit hydrologic unit code (HUC)

## 12. Web Services

This section is Under Construction.

# 13. Glossary

**Assay:** A procedure for testing the presence or absence of a pathogen in an organism or organic sample.

**Base Map:** Refers to a map that depicts the fundamental map elements, such as political boundaries, cities, streams, etc., which are used frequently for locational reference. It is the basis from which various other maps in a geographic information system (GIS) are constructed.

**Case:** Refers to a group of aquatic animals that are collected in a single effort at a single location. Many species may be included in a single case.

**Cell Culture:** The process by which cells are grown under controlled conditions in a prepared medium. The cells are then used to screen for pathogens, especially viruses or other intracellular parasites, in specimens.

**Clinical Signs:** Indications of disease. The National Wild Fish Health Survey does not focus on searching for clinical signs, and the protocols do not require examination for clinical signs. The database does provide the option for reporting clinical signs if the lab chooses to do so.

**CONUS:** A military abbreviation for the contiguous United States. Also referred to as the lower 48 states in the North American continent. All US states excluding Alaska and Hawaii.

**Corroborative assay:** This is the second method that might be used to test a specimen when the preliminary procedure indicates the possible presence of a pathogen. The current list of corroborative methods is available in the NWFHS Laboratory Procedures Manual.

**CSV:** The comma separated values (CSV) file format is used for the digital storage of tabular data. CSV is a format commonly used by spreadsheet and database applications.

**Datum:** A datum is a geodetic reference system that specifies the size and shape of the earth, and the base point from which the latitude and longitude of all other points on the earth's surface are referenced.

**Disease:** An abnormal condition of an organism that impairs bodily functions, often associated with specific symptoms and signs.

**ELISA:** Enzyme- linked immunosorbent assay is a biochemical technique used mainly in immunology to detect the presence of an antibody or an antigen.

**FAT:** Fluorescent antibody test, an immunofluorescence technique in which antigen in tissue sections is located by a homologous antibody labeled with fluorochrome or by treating the antigen with unlabeled antibody followed by a second layer of labeled antiglobulin that is reactive with the unlabeled antibody.

**Feature:** In geographic information systems, a feature is an entity with a geographic location, typically describable by points, arcs, or polygons. Features are usually labeled.

**GIS:** Geographic information systems (GIS) or geospatial information systems is a computer system for capture, storage, retrieval, analysis and display of spatial (locationally defined) data.

**GNIS:** Geographic Names Information System (GNIS) is a database that contains name and locative information about more than two million physical and cultural features located throughout the United States of America and its territories. It is a type of gazetteer. GNIS was developed by the United States Geological Survey in cooperation with the United States Board on Geographic Names (BGN) to promote the standardization of feature names.

**GPS:** A constellation of satellites originally developed by the U.S. Department of Defense as a navigation aid. It is now used by the civilian community for navigation and horizontal/ vertical positioning of features.

**HUC:** The United States Geological Survey (USGS) Hydrologic Unit Code. The United States is divided and sub- divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system.

**ITIS:** Integrated Taxonomic Information System, contains taxonomic information on plants, animals, fungi, and microbes of North America and the world. See http:// www.itis.gov/

**KML:** Keyhole Markup Language is an XML- based language schema for expressing geographic annotation and visualization on existing or future Web- based, two- dimensional maps and three- dimensional Earth

browsers. KML was originally developed for use with Google Earth. It has since been recognized as an official standard by the Open Geospatial Consortium.

**Layer:** Distinct map theme. A logical separation of mapped data such as roads, political boundaries, etc. Layers are all registered to one another by means of a common coordinate system.

**Legend:** The reference area on a map that lists and explains the colors, symbols, line patterns, shadings, and annotation used. The legend often includes the scale, origin, orientation, and other map information.

**Map Scale:** The relationship existing between a distance on a map and the corresponding distance on the earth. A scale of 1 inch = 2000 feet can also be expressed as 1:24,000 (i.e., 1 inch on the map to 24,000 inches on the earth).

**Marker:** Markers are the "balloons" that appear on the map after a search is performed. In the NWFHS mapping interface, the markers correspond with the cases that are in the results table.

**Metadata:** Information that characterizes data. Metadata are used to provide documentation for data products. In essence, metadata answer who, what, when, where, why, and how about every facet of the data that are being documented.

**NWFHS:** The National Wild Fish Health Survey.

**Overlay:** A map layer that is "stacked" above the base layer, see also layer.

**Panel:** The main NWFHS mapping interface is composed of discreet sections: map, search, toolbar. These sections are referred to as panels.

**Pathogen:** An agent of disease. The term pathogen is most commonly used to refer to infectious organisms. These include bacteria, viruses, and parasites. The presence of a pathogen does not always mean an organism has a disease.

**Pathogen Not Detected:** This indicates that 1 or more samples met all of the search criteria and that all of the involved pools tested negative with the preliminary procedure. This indicates absence of the pathogen, or of previous exposure to the pathogen, in the set of aquatic animals constituting the tested pools. This does not, however, prove absence of the pathogen from this aquatic animals species in the body of water where the collection originated, because the collection is a sample, and other individual aquatic animals that were not included in the sample might still have been positive for the pathogen.

**PCR:** Polymerase Chain Reaction is a technique to multiply a single or few copies of a piece of DNA across several orders of magnitude, generating millions or more copies of a particular DNA sequence

**PDF:** Portable Document Format (PDF) is a file format created by Adobe Systems in 1993 for document exchange

**Pool:** Refers to a collection of tissue(s), from 1 or more individual aquatic animals in a case, submitted as an aggregate for testing. There could be many pools for a single tissue sample in a single case. The database offers the option for recording, at the time of data entry, which individual aquatic animals contributed to a particular pool.

**Positive Result:** Refers to a result of an assay indicating presence of, or previous exposure to, a pathogen in that pool.

**Preliminary Procedure:** This is the first method that is applied to all pools to be tested. The current list of preliminary procedures is available in the NWFHS Laboratory Procedures Manual.

**Relational Database:** A database structure composed of more than one flat file (2- dimensional array). Because of relationships between the data in the records, the data can be transformed to form new combinations of columns and rows.

**Serum Agglutination:** The clumping of cells such as bacteria or red blood cells in the presence of an antibody. The antibody or other molecule binds multiple particles and joins them, creating a large complex

**Shapefile:** A popular geospatial vector data format for geographic information systems software.

**Species Code:** A unique, three- letter code used to designate fish species, sub- species, or regional species variation for the National Wild Fish Health Survey. These codes are not necessarily the same as other fish species codes developed by individual states or other entities.

**Specimen:** The tissue, or combination of tissues, collected from a sample (species).

**TOPO:** Short for Topographic Map, which show the relief, elevation or shape of the earth in a given area.

**TSN:** A Taxonomic Serial Number (TSN) is a unique, persistent, non- intelligent identifier for a scientific name in the context of the Integrated Taxonomic Information System (ITIS).

**URL:** Uniform Resource Locator. Web addresses are a type of URL.

**W3C:** World Wide Web Consortium. It is the main international standards organization for the World Wide Web

**Watershed:** A term used to describe the geographic area of land that drains water to a shared destination. 8- digit hydrologic unit codes are often equated with watersheds.

**Web Service:** Defined by the W3C as "a software system designed to support interoperable machine- to-machine interaction over a network". Web services are often used to provide access to data over the internet via web based applications.

**XML:** XML- Extensible Markup Language is a general- purpose specification for creating custom markup languages. Often used to transfer data between computer systems.

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